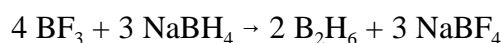


Chem 115
Test 1 Review Problems

1. Fill in either the name or formula, as required.

Cu_2S	
	barium nitride
$\text{Al}(\text{ClO}_3)_3$	
	dinitrogen hexoxide

2. Boron forms a large number of compounds with hydrogen, called boranes, which are named by their own nomenclature system. Consider a 25.00-g sample of pentaborane-9, B_5H_9 , [m.w. $\text{B}_5\text{H}_9 = 63.12$ u; at. wt. B = 10.81 u; at. wt. H = 1.008 u]
- How many moles of B_5H_9 are in the sample?
 - How many moles of hydrogen are in the sample?
 - How many boron atoms are in the sample?
 - What is the weight percentage of boron in the sample?
3. Complete and balance the following reactions:
- $\text{C}_3\text{H}_7\text{OH} + \text{O}_2 \rightarrow$ (combustion)
 - $\text{NH}_3 + \text{O}_2 \rightarrow \text{N}_2 + \text{H}_2\text{O}$
 - $\text{B}_2\text{O}_3 + \text{C} + \text{Cl}_2 \rightarrow \text{BCl}_3 + \text{CO}_2$
4. A compound is analyzed and found to consist of 43.58% phosphorus and 56.42% sulfur. What is its empirical formula? Assuming that the empirical and molecular formulas are the same, what is the name of the compound? [at. wt. P = 30.97 u; at. wt. S = 32.07 u]
5. A 0.7323-g sample of a certain hydrocarbon (compound of carbon and hydrogen only) is analyzed by combustion, yielding 2.218 g $\text{CO}_2(g)$ and 1.135 g $\text{H}_2\text{O}(l)$. If the molecular weight is found to be 58.12 u, what is the molecular formula? [m.w. $\text{CO}_2 = 44.01$ u; m.w. $\text{H}_2\text{O} = 18.02$ u; at. wt. C = 12.01 u; at. wt. H = 1.008 u].
6. Diborane, B_2H_6 (m.w. = 27.67 u), is a useful reagent in organic syntheses. It can be prepared by the reaction



How many grams of diborane should be produced in the reaction of 6.00 g of BF_3 (m.w. = 67.80 u) and 2.75 g of NaBH_4 (f.w. = 37.83 u)?